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CLAIMS

1. A system for melting ice, comprising:

an electrical conductor 104 for generating an ~~AEF~~ alternating electric field in response to an AC voltage;

a gas-filled layer 110 proximate to the electrical conductor, the gas-filled layer containing a plasma-forming gas for forming a plasma in response to an ~~AEF~~ alternating electric field.

2. A system as in claim 1, further comprising:

a conductive layer located proximate to the electrical conductor.

3. A system as in claim 2, wherein the gas-filled layer is located between the electrical conductor and the conductive layer.

4. A system as in claim 2, wherein the conductive layer comprises ice.

5. A system as in claim 1, wherein the electrical conductor is a main conductor of a power transmission line.

6. A system as in claim 1, further comprising:

an AC power source for applying an AC voltage to the electrical conductor.

7. A system as in claim 1, further comprising:

an AC voltage in the electrical conductor that generates an ~~AEF~~ alternating electric field, which ~~AEF~~ alternating electric field causes electric breakdown in the gas-filled layer.

8. A system as in claim 7, wherein the AC voltage has a frequency in a range of about from 50 Hz to 1 MHz.

9. A system as in claim 7, wherein the AC voltage has a voltage in a range of about from 10 kV to 1300 kV.

10. A system as in claim 1, wherein the gas-filled layer comprises a gas selected from the group consisting of air, nitrogen and argon.

11. A system as in claim 1, wherein the gas-filled layer has a thickness in a range of about from 0.5 to 10 mm.

12. A system as in claim 1, further comprising an outer shell, wherein the gas-filled layer is

disposed between the electrical conductor and the outer shell.

13. A system as in claim 12, wherein the outer shell is electrically nonconductive.

14. A system as in claim 12, wherein the outer shell is electrically conductive.

15. A system as in claim 14, further comprising a switch for electrically shorting the electrical conductor and the conductive outer shell.

16. A system as in claim 1, wherein the gas-filled layer comprises gas-containing balls.

17. A system as in claim 1, further comprising a flexible band that contains the gas-filled layer.

18. A system for generating heat, comprising:

an electrical conductor for generating an ~~AEF~~ alternating electric field in response to an AC voltage;

a gas-filled layer proximate to the electrical conductor, the gas-filled layer containing a plasma-forming gas for forming a plasma in response to an ~~AEF~~ alternating electric field;

an AC power source for applying an AC voltage to the electrical conductor.

19. A system as in claim 18, further comprising:

a conductive layer located proximate to the electrical conductor.

20. A system as in claim 19, wherein the gas-filled layer is located between the electrical conductor and the conductive layer.

21. A system as in claim 18, wherein the AC power source provides an AC voltage for generating an ~~AEF~~ alternating electric field having sufficient field strength to cause electric breakdown of gas in the gas-filled layer when a conductive layer is proximate to the electrical conductor.

22. A system as in claim 18, wherein the AC power source provides an AC voltage for generating an ~~AEF~~ alternating electric field having a strength in a range of about from 1 to 100 kV/cm.

23. A system as in claim 18, wherein the AC power source provides an AC voltage in a range of about from 10 kV to 1300 kV.

24. A system as in claim 18, wherein the AC power source provides an AC voltage having a frequency in a range of about from 50 Hz to 1 MHz.

25. A method for melting ice, comprising a step of:

generating an ~~AEF~~ alternating electric field in a gas-filled layer proximate to the ice for causing electric breakdown of gas and the formation of plasma in the gas-filled layer.

26. A method as in claim 25, wherein the step of generating an ~~AEF~~ alternating electric field includes generating an AEF having a strength in a range of about from 1 to 100 kV/cm.

27. A method as in claim 25, wherein the step of generating an ~~AEF~~ alternating electric field includes applying an AC voltage to an electrical conductor.

28. A method as in claim 27, wherein applying an AC voltage to the electrical conductor includes applying a voltage in a range of about from 10 kV to 1300 kV.

29. A method as in claim 27, wherein applying an AC voltage to the electrical conductor includes applying a voltage with a frequency in a range of about from 50 Hz to 1 MHz.

30. A method as in claim 27, wherein the electrical conductor is a main conductor of a power transmission line.

31. A method as in claim 27, further comprising disposing the gas-filled layer between the electrical conductor and a conductive layer.

32. A method as in claim 31, wherein the conductive layer includes ice.

33. A method as in claim 31, wherein the conductive layer includes a conductive metal-containing material.